

THE CHESTNUT-COLLARED LONGSPUR IN MANITOBA

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THE nesting habits of the Chestnut-collared Longspur (*Calcarius ornatus*) were studied during the years of 1930 to 1932 inclusive, on a half square mile of prairie pasture on the western outskirts of Winnipeg, Manitoba.¹ A total of 23 nests were observed.

MIGRATION

Spring. The first arrivals were noted on April 10 (1932), April 11 (1930), and April 12 (1931). The main migration began a day or two later, and lasted until about April 18. After that date, occasional birds were seen flying overhead, but such flights seemed to be only local wanderings. On the first day of migration, no more than a single individual was usually noted, but afterwards 10 or 12 were counted in a day. They arrived principally during the forenoon, either singly or in groups of two or three.

Autumn. The birds collected into flocks before turning southward. Young birds were the first to gather, frequenting the outskirts of the nesting areas. With the termination of nesting about the middle of August, adults joined the flocks of juveniles. The species then entirely abandoned the grassy breeding grounds, and was found in adjacent ditches, dried-up sloughs, and similar low-lying, rough ground (though rarely stubble or plowed land). This rather remarkable change of habitat may be due to the availability of the autumn crop of weed seeds, combined with the reduced number of grasshoppers, which constitute the bulk of the species' food in summer; but the cause may lie deeper than that, and involve the psychological and physiological changes bound up with migration. Young and old together spent the last half of August in the new habitat, in loose, restless flocks numbering up to 30 or more individuals. During September, southward migration began, and the latest date on which I noted the species at Winnipeg was September 28.

PRE-NESTING PERIOD

Habitat. On arrival in April the birds settled immediately on their breeding ground. In the present study, this consisted of prairie, its flatness relieved by occasional low ridges and shallow sloughs. The dominant vegetation was composed of grasses of the following species: *Panicum virgatum*, *Poa arida*, *Agrostis hyemalis* and *Agropyron tenerum*. Wolfberry (*Symphoricarpos occidentalis*) in straggling

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patches, prairie sage (*Artemisia gnaphalodes*), goldenrod (*Solidago canadensis* and *S. hispida*), and gum-weed (*Grindelia squarrosa*) were also present.

Courtship and mating. During a visit to the nesting area on April 14, I found the birds widely scattered and wandering restlessly. I heard no singing. Although the snow had disappeared and higher spots were dry, low-lying areas were covered with water. Only a few insects had appeared. Five days later the land had dried considerably. Both males and females were present in abundance, and a few males were in song. At least two males, one of which was accompanied by a female, appeared to have staked claims to territories. On April 27, singing was vigorous, and swift erratic pursuits of females by males were frequent. On May 9, I observed competition between males for the same female, once seeing as many as four males together, fighting, singing, and springing aloft in outbursts of zeal. By May 22 all the birds were paired.

Territory. A nesting territory of this species is usually roughly circular in shape, and comprises an area of short, open grass, with a variable quantity of wolfberry used by the male for perches. Two territories that were measured contained 25,000 and 45,000 square feet respectively. The territory has no definitely marked boundary, but merges into an area of unclaimed ground which the nesting pair may occasionally visit. Tussles between neighboring males sometimes take place in this area, both on the ground and in the air, and always seem to end with the retreat of the one that has ventured the farther from his own territory.

NESTING

Nest construction. The nest is located in the central part of the territory. A second nest built by one pair was placed 40 feet away from their first nest; another pair built their second nest 100 feet from their first. These moves involved no alteration in the boundaries of the territories. The nest is built on the ground, in light to moderately thick grass, sometimes in a scattered growth of short wolfberry. Of the 23 nests found, 10 were beside cattle droppings. DuBois (1935:70-71) records several nests well concealed. In the present study the nests were usually situated in rather sparse cover a few inches high. Only one nest was located in heavy grass. Grass was always the main cover plant; in four instances, wolfberry contributed to the concealment; gum-weed was present around one nest, and other herbaceous plants around another. The poorer concealment noted in this study, as compared with the findings of DuBois, may have been partly attributable to grazing and to the abundance of grasshoppers. The nests measured in internal diameter, 2.2 to 2.6 inches; in internal depth, 1.5 to 1.9 inches. The lower portion of the nest fits into a hollow in the ground, excavated, according to Bailey and Niedrach (1938:244),

by the female. Above ground, there is a large, solid rim of dry grass. The wall is thin but firmly woven, of dry grass, with, occasionally, leaves and herbaceous stems; it is usually lined with finer grass, and in two nests a little horse or cow hair was added to the lining. In the nests described by DuBois (1935:71), only grass was used in the main body of the nest, with hair often added in the lining.

Nesting season. During the three seasons of this study, I found a total of 23 nests (Table 1), the earliest on May 27 (two nests: No. 11, which contained one egg; and No. 12, which was under construction), the latest on August 1 (nest No. 23, which contained one egg and four young). Sixteen of the nests contained eggs when found, three contained young, three contained both eggs and young, and one (mentioned

TABLE 1
NESTING DATA FOR THE CHESTNUT-COLLARED LONGSPUR
AT WINNIPEG, MANITOBA, 1930-1932

Nests	Date found	Contents when found	Total eggs laid	Date of hatching	Size of brood	Date of nest-leaving
No. 7	June 29	5 e	6	July 10	6	July 19
8	July 17	5 e	5	July 19	4	
9	July 31	5 e	5	Aug. 5	5	Aug. 14
10	July 31	4 e	4	Aug. 1-4	3	Aug. 11-13
11	May 27	1 e				
12	May 27	0				
13	June 13	1 e, 4 y			4	
14	June 13	1 e, 5 y			5	
15	June 13	5 e	6	June 23-24	6	July 3-4
16	June 16	5 y			5	
17	July 8	1 e	4	July 21	3	July 31-Aug. 1
18	July 17	5 e	5	July 27-29	5	Aug. 4-6?
19	July 18	5 e	5	July 23-?	?	
20	July 20	4 e	4	July 23-?	3	Aug. 2-3
21	July 20	4 e	4	July 23-24	4	
22	July 26	5 y			5	July 26
23	Aug. 1	1 e, 4 y			4	Aug. 7-8?

e = eggs; y = young.

See text for data on Nests 1 to 6, and for further data on Nests 8, 11, 12, 17, 18, 23.

above) was under construction. I found nests with young as early as June 13 (Nests 13 and 14), but the earliest hatching I actually observed was June 23 (Nest 15). Table 1 summarizes the nesting data; Table 2 presents an analysis of egg-laying dates.

Description of eggs. Thirty-four eggs, comprising eight sets, were measured. The means were as follows: long diameter, 20.0 ± 2.0 mm.; short diameter, 14.5 ± 1.2 mm. Their shape was ovate, but in one set examined the eggs were unusually rounded, almost broadly elliptical. One abnormal egg was seen—not included in the above measurements—

the smaller end of which was elongated for about 3 mm. DuBois (1935:69) records one set (out of 21 sets found) of small, nearly spherical eggs. The ground color of the eggs ranged from a greenish white through various shades of white, gray and buff, to a deep brownish buff. The first and last shades were unusual, however, and the most common color was one varying from gray to pale buff. The markings consisted of deposits of dark reddish-brown pigment, either on or below the surface of the shell, in the latter case appearing a cloudy lavender color. The markings varied from fine specks and lines to heavy irregular blotches (a wide mixture occurring in a single egg), and were most dense at the larger end.

Date of laying. Table 2 shows the distribution (by 10-day periods) of the dates of completing egg-sets in Manitoba, together with a similar distribution given by DuBois (1935:69) for Montana. A comparison

TABLE 2
DISTRIBUTION BY TEN-DAY PERIODS OF THE DATES OF COMPLETING EGG-SETS

DuBois, Montana		Harris, Manitoba	
Period	No. completed	No. completed	Nests
May, 1st third	1 (4.5%)	0	—
2nd third	5 (22.8%)	0	—
3rd third	2 (9.1%)	3 (17.6%)	Nos. 11, 13, 14
June, 1st third	6 (27.3%)	3 (17.6%)	Nos. 8, 12, 16
2nd third	2 (9.1%)	1 (5.9%)	No. 15
3rd third	3 (13.6%)	1 (5.9%)	No. 7
July, 1st third	3 (13.6%)	1 (5.9%)	No. 22
2nd third	0	6 (35.3%)	Nos. 17-21, 23
3rd third	0	2 (11.8%)	Nos. 9, 10
	22 (100.0%)	17 (100.0%)	

Data from 17 clutches (Nests 7 to 23—see Table 1). The date of laying of the final egg was known from actual observation at three nests (Nos. 7, 15, and 17); hypothetical dates of May 30 and June 3 were used for Nests 11 and 12 (see text); for the remaining twelve nests the date of laying of the final egg was calculated on the basis of an ascertained laying rate of one egg per day.

of the two sets of figures shows that nesting is one or two weeks later in Manitoba than in Montana. The figures also point to the existence of two main egg-laying periods. In the present study, the first main period extended from late May through early June, the second from July 11 to 20. The date of laying the first egg of a clutch was known from actual observation at two nests: May 30 at Nest 12; July 8 at Nest 17. The date of laying the last egg of a clutch was known at three nests: June 30 at Nest 7, June 14 at Nest 15, July 11 at Nest 17. Thus both dates were known from actual observation only at Nest 17:

July 8 to July 11 (a clutch of four). The dates for other nests were calculated, however, on the basis of an ascertained laying rate of one egg per day.

Number of sets. Two of the pairs under observation each completed at least two nestings in a season. Apparently no change of mates took place, but this point was not definitely ascertained. In the case of one pair (Pair C), laying of the first clutch began on June 9 (nest No. 15, Table 1); the six young left the nest on July 3 and 4; on July 8 laying of the second clutch (nest No. 17) began; only four eggs were laid; the young left on July 31 and August 1. Pair B had been observed feeding a brood of young in their territory when their first observed nest (No. 7) was found on June 29. The nest contained five eggs, a sixth egg was laid on June 30, and six young left the nest on July 19. The young they had been feeding remained in the territory until July 6. Another nest (No. 9) of this pair was found July 31, when it contained five eggs; five young left on August 14. DuBois (1935:69) concludes from his tabulation of data (summarized with mine in Table 2 of this paper) that "the distribution of dates . . . leaves it uncertain whether more than one brood is raised each year," and that the protracted nesting season may be due to repeated unsuccessful trials. But it would seem from the above evidence that three broods are at least occasionally raised in a season, while two per year is a common condition, and perhaps the normal one.

Size of clutch. The following data are taken from the clutches known to be complete (nests Nos. 7-10, 15, 17-21, Table 1): number of clutches, 10; number of eggs, 48; average number of eggs per clutch, 4.8. The frequency distribution is as follows: 4 clutches of four; 4 clutches of five; 2 clutches of six. In Montana, DuBois found (in 20 sets known to be complete): 14 sets of four eggs; 6 sets of five; none of six. Pairs A, B, and C, all known to have nested twice or three times, each had a clutch of six in their first observed nest of the season; Pairs A and C had clutches of four, Pair B, a clutch of five in the second observed nest of the season.

Incubation. Eggs are laid on successive days. Although laying appears to take place only in the early part of the morning, the female is usually to be found on the nest at any time of day. The incubation period (from the laying of the last egg to the hatching of the last), determined at three nests (Nos. 7, 15, and 17), was 10 days, though DuBois (1935:70) records 12½ days for one nest (in Montana). Incubation is by the female only. She is difficult to flush, and some individuals, when discovered, drag themselves away through the grass with wings half spread and fluttering. Once having left the nest, she remains hidden until the observer has gone.

Activities of male. During the incubation period, the male divides his time between feeding quietly in his territory and mounting guard on his favorite perch. Wolfberry is used by the male for perches—

though he may also select stones, fences, and telephone wires when these are present. Perches are rarely used by the female during nesting, but regularly by the male, who selects one or two definite stations near the nest. He watches attentively for his mate, and when she flies to or away from the nest, he follows and alights beside her. Now and then throughout the day he launches himself into the air, rises to a height of 10 to 50 feet, spreads wings stiffly, and, floating slowly to earth, delivers his short, clear melody. At the approach of a human intruder, the male retires to his favorite perch, from which he marks the intruder's progress. With uneasiness growing stronger, he takes wing and flies back and forth over his territory, giving utterance to a warning *wheer* note and sometimes a song. Some males have a habit on these occasions of reaching the highest point of their flight directly over the nest.

Hatching. In one observed case, hatching of one egg required over half a day, but in the majority of cases it seemed to take a shorter time. An irregular series of perforations is made by the young bird around the circumference of the shell about mid-way down the main axis. When the cut is completed, and the young bird has finally extricated itself, the two halves of the shell are carried away by the parent; pieces of shell have been found as far as a hundred feet away from the nest.

YOUNG

First day. Newly hatched birds lie prone in the nest, flexing their limbs only occasionally, and raising their heads with difficulty. They are covered with buffy gray down about one-fourth inch long. On the capital tract two rows of down, beginning at the loral region, run posteriorly to the occipital region, where they join a transversely placed tuft. An isolated tuft stands above each eyelid. A wide patch occurs in the spinal region, narrowing as it enters the pelvic region. Down is abundant in the humeral tract. In the alar tract, it is distributed in two rows on the dorsal surface. A prominent patch is found in each femoral tract, and scattered tufts can be detected in the crural tract. Mandibles are flesh color, darkening at the tip. Tarsi, toes, and claws are pale flesh color.

Second day. The young show a little more activity on the second day. They are brooded by both parents² alternately for periods of from one to 20 minutes, each period being terminated by the arrival of the other parent with food.

Fourth day. Feather sheaths in all tracts are above the skin. The eyelids are now separated but cannot be moved.

Sixth day. The birds struggle when handled; eyelids are movable; feathers are beginning to break sheaths on all parts except the head.

² In my notes, the male is recorded as taking part in brooding, but Margaret Morse Nice (1943, *in litt.*) thinks that if a bird does not incubate it probably doesn't brood, and suggests that the male Longspurs may have merely stood over the young as she has observed male Song Sparrows do. I have not had the opportunity to clarify the point.

As an indicator of the rate of feather growth, the length of a single primary was measured daily in the case of several birds. Plotted graphically, these measurements showed an almost constant rate of growth, and graphs of the measurements of young from two different nests were almost exactly equivalent. Starting at zero on the second day, growth proceeded at the rate of 2 mm. per day up to the fourth day; it then maintained a steady rate of 3 mm. per day for the remainder of the nestling period.

TABLE 3
CARE OF YOUNG (AT NEST 18)

	Age 1-3 days	Age 5-7 days
Period observed	July 30, 11:00-12:04 A.M.	Aug. 3, 11:15-12:18 A.M.
No. nestlings	5	5
Feedings by ♂	8	2
Feedings by ♀	9	24
♂ brooded ^a	Twice (total of 4 min.)	0
♀ brooded	8 times (total of 44 min.)	0
♂ cleaned nest	Once ^b	0
♀ cleaned nest	Twice ^c	7 times ^d

^a See Note 2 of text.

^b ♂ swallowed one sac, flew away with one.

^c ♀ swallowed three sacs.

^d ♀ carried away sacs.

Parental attention. Male and female share the burden of caring for the young in the nest, but the male's part is a subordinate one. Brooding periods become progressively shorter, and daytime brooding ends altogether on the fifth day after hatching. Thenceforward the daylight hours are spent, by the female particularly, in an almost ceaseless hunt for and transport of food. Both parents clean the nest, either swallowing the sacs or flying off and dropping them some distance way. Two observations on feeding visits are summarized in Table 3. As the nestling period progressed, rate of feeding and of nest cleaning increased, though the male grew less attentive. So far as could be determined by observations from blinds placed two to three feet from the nests, the almost exclusive food of nestlings is grasshoppers, which, during the years when the present study was made, were extremely abundant. Species collected are as follows: *Chorthippus curtipennis*, *Camnula pellucida*, *Arphia pseudonietana*, *Melanoplus dawsoni*, *Melanoplus bivittatus*, *Gryllus assimilis* (identified by Norman Criddle).

Nest leaving. The young left the nest when 9, 10, or 11 days old; DuBois (1935:68) gives a nestling period (one nest) of "about 10½ days." The actual departure of a brood was witnessed once. The move-

ment, perhaps stimulated by my activity around the nest, began without warning. The birds suddenly became very restless, kicking violently, and soon were panting hard for breath. After a few minutes they stopped simultaneously, and were quiet for about ten minutes. Again they began, and this time one bird, curiously enough the smallest of them all, pushed itself over the rim and crawled and hopped away from the nest in a wildly erratic course, finally coming to rest beside me two feet from the nest. Meanwhile, another bird, which had projected itself over the opposite side of the nest, turned back, and, shoving itself across the backs of its fellows in the nest, went toward the first one. The birds began to utter the *chi-eeep* note and were answered by their parents, which were flying about overhead. After a general period of rest, a third one managed to scramble out, and the second one, in amazingly strong hops, followed an aimless course around the nest.

POST-NESTLING PERIOD

On the day of nest leaving, the bird is quite incapable of flight, and, except for occasional attempts at hopping, it remains crouched in the grass, receiving food from its parents. It grows, however, with extraordinary rapidity. After another day it is able to fly, when alarmed, for 100 feet or more. The flight is direct and labored. After alighting, the bird crouches upon the ground—I did not determine the age at which it is able to stand upright and walk.

Fourteen days after hatching (four days after leaving the nest), the young bird begins to use the *til-lip* call note characteristic of the species. Its flight has now become undulating.

On the fifteenth day the bird is still being fed regularly by the male parent and occasionally by the female. If another nest is to be started, the female stops caring for the young at a time varying from two to seven days after they have left the nest; thenceforth they are in the sole care of the male.

By the twenty-fourth day, the bird appears to be fully grown. It may still be attended by the male parent, but it has sometimes to assume a begging posture, with wings outspread and fluttering, before the parent will give it food.

It begins to wander at large on about the twenty-sixth day. If the parents are finished nesting, young and old go off together, but otherwise the young bird joins roving bands of juveniles.

NESTING SUCCESS

For the three seasons of this study, nesting success was remarkably high. In 10 nests for which there are adequate data (Nests 7, 9-12, 15, 17, 18, 20, 23—see Table 1), a total of 44 eggs were laid (this includes five eggs for Nest 23 where four eggs had already hatched when I discovered the nest). Of these 44 eggs, three failed to hatch (one each at Nests 10, 20, 23); six disappeared (one each at Nests 11

and 17, four at Nest 12). Of the 35 young which hatched successfully in these 10 nests, three were killed in a storm (one at Nest 18, two at Nest 23); and 32 young (72 per cent of the total number of eggs laid in the 10 nests), reached nest-leaving age. Mrs. Nice (1937:143) estimates an average of 40 to 46 per cent success for open nests in the North Temperate Zone. (For comparison: leaving out of consideration young already hatched when nests were first discovered, a total of 80 eggs was recorded in all 23 nests: 40 of these hatched, 5 failed to hatch, 7 disappeared, 4 were collected; for the remaining 24 eggs, data are either lacking, as in Nests 2, 4, and 5, for example, or inadequate, as in Nest 19, and they must be classified under "fate unknown.")

Because of incomplete data, 6 of the 23 nests found are not included in Table 1: Nest 1 (with 3 young) and Nest 2 (with 5 eggs) were found on July 15; Nest 3 (with 4 Longspur and 2 Cowbird eggs—all collected) was found on July 13; Nest 4 (with 4 eggs) on July 22; Nest 5 (with 5 eggs) on June 6; Nest 6 (with 6 eggs) on June 28. There were no later data on Nests 1-5. In Nest 6, I found one young with skull open on July 17; the other five eggs may have hatched and the young left.

Data (not included in the table) on other nests are as follows: In Nest 8 (found July 17 with 5 eggs), one egg disappeared between July 17 and 20; the parents deserted the nest and young (hatched July 19) when I erected a blind near the site. Nest 11 (found May 27 with one egg) was abandoned after the egg disappeared on May 29. Nest 12 was discovered on May 27, when it was still under construction; it was finished May 29; the first egg was laid May 30; three more eggs were laid on the three succeeding days, but all disappeared on June 6. In Nest 17 (found July 8 with one egg) four eggs were laid, but one disappeared on July 18. A sudden rainstorm, accompanied by a sharp drop in temperature, occurred on August 6 when the five young in nest No. 18 were 8 to 10 days old, and the four young in nest No. 23 were obviously ready to leave the nest (their exact age was unknown). Later I found one dead young outside nest No. 18, and two dead in nest No. 23. I found no trace of the other young, which also may have been killed by the storm.

I did not identify the agents responsible for the disappearance of the seven eggs (one each at Nests 8, 11, and 17; four at Nest 12). The ground squirrel (*Citellus tridecemlineatus*) and the garter snake (*Thamnophis sirtalis*) were likely suspects.

VOICE

Song. The song is a short trill, lively and melodious, generally given as the bird glides to earth on set wings after an upward flight to a height of 25 to 50 feet. The song conforms almost invariably to one pattern, except in the ending, which varies between individuals. My own rendition of it is: *say it loud, so loud, ul - ee - ee*, and these words

indicate the tone and tempo fairly well. One male, instead of using this song pattern, sang a curious combination of alarm and flocking notes: *wheer wheer wheer, lil-lip*. Longspurs appear to explore the possibilities of their voice in the first autumn, for on August 15, a young bird perching on a fence was heard to utter hesitantly a jumble of notes reminiscent of a distant flight song of a Western Meadowlark. It experimented with variations for several minutes.

Calls. The common call note is a *til-lup* or *til-lip* (the accent on the first syllable), sometimes lengthened to *til-lil-lip*. It is a general flocking and flight note, and in the breeding season it seems to express anxiety. The usual alarm note is a whistled *wheer*, used mostly by the male. A *tzip* and a rattling *tri-ri-rip* indicate extreme alarm and perhaps anger. On coming to the nest with food, the female sometimes utters a soft *lu*, and the young then stretch open their mouths. Low, conversational notes are exchanged between the parents at the nest.

NOTES ON PLUMAGES

On arrival in spring, some birds are not yet in full breeding plumage (produced by molt on head and throat, and by wearing off of the buffy tips from the black and chestnut of the body plumage—see Dwight, 1900:184). A male, for example, was seen on April 27 that had a large area of the black underparts still covered by the pale feather tips. Post-nuptial molt begins about July 20 and is still incomplete when the birds move south. Occasionally a male is encountered in summer with areas of chestnut on the black underparts. Another anomaly is the occurrence of females in male plumage. DuBois (1935:69, and 1937:107) observed at least three females of this type, one "with all the male markings"; the others in an intermediate plumage, with the black underparts, but lacking the chestnut collar. A female with this intermediate type of plumage was collected on June 14, 1933, by T. M. and A. H. Shortt on my study area (it was carefully sexed). The specimen is now in the Royal Ontario Museum of Zoology. The whole plumage was like that of a male, except that all the browns were paler.

SUMMARY

A study was made of 23 nests of the Chestnut-collared Longspur (*Calcarius ornatus*) during the years 1930 to 1932 near Winnipeg, Manitoba.

Spring migration extended from about April 10 to April 18. Fall migration began with flocking (the young gathering first) on the outskirts of the nesting areas; the last stragglers had left by the end of September.

Courtship and territory selection began in the latter part of April and early May.

Territories were roughly circular, from 25,000 to 45,000 square feet in area.

Most of the nests were placed in low grass with little concealment.

Egg laying in Manitoba began in late May (two weeks later than DuBois found for Montana).

Clutches varied from 4 to 6 eggs, the average of 10 clutches being 4.8. (No six-egg sets were found by DuBois in Montana.)

Two nestings per season seemed to be usual, and three nestings occasional. Later sets were smaller than the first.

Incubation was by the female only, but the parents shared in caring for the young. The incubation period (determined at three nests) was 10 days; the nestling period, from 9 to 11 days. The young were independent 24 days after hatching (14 days after leaving the nest).

Nesting success for 10 nests was 72 per cent.

Except in its ending, the flight song conformed almost invariably to one pattern. In addition to the flight song, the Longspur used a variety of call notes.

The postnuptial molt (which is complete) began about July 20; the prenuptial molt is incomplete.

One female was recorded whose plumage resembled that of the male.

LITERATURE CITED

- BAILEY, ALFRED M., and ROBERT J. NIEDRACH
1938 The Chestnut-collared Longspur in Colorado. *Wils. Bull.*, 50:243-246.
- DUBOIS, A. DAWES
1935 Nests of horned larks and longspurs on a Montana prairie. *Condor*, 37:56-72.
1937 Notes on coloration and habits of the Chestnut-collared Longspur. *Condor*, 39:104-107.
- DWIGHT, JONATHAN, JR.
1900 The sequence of plumages and moults of the passerine birds of New York. *Annals N. Y. Acad. Sci.*, 13:73-360, pls. 1-7.
- NICE, MARGARET M.
1937 Studies in the life history of the Song Sparrow. Part 1. *Trans. Linn. Soc. N. Y.*, 4.
- BINSCARTH, MANITOBA